



RESEARCH PAPER

The Technological Competition between USA, Europe and China and its Geopolitical Implications

¹Mubasshar Hassan Jafri and ²Dr. Sabir Ijaz

1. Author is an educationalist
2. Assistant Professor (visiting) Department of International Relations, National University of Modern Languages (NUML) Karachi Campus, Sindh, Pakistan

***Corresponding Author**

sabir.ijaz@numl.edu.pk

ABSTRACT

The paper examines the technological competition among major powers. It suggests that tech supremacy will define who holds the future. The technology competition or war primarily began between United State of America (USA) and China has also engulfed European and Asian states which are advanced in High-Tech Manufacturing (HTM). Both the US and China want global supremacy in HTM like Artificial Intelligence (AI), semiconductors, quantum computing and innovation system. To maintain its status as a leading super power, United States of America (USA) has introduced policies to restrict its allies' to sell HTM to Beijing. Conversely, China has established strong economic ties with the HTM countries over the past few decades. The study is simply qualitative and utilized secondary data. The race for technological supremacy will be won by the country which had the support of HTM producing countries. Both the US and China want these states to remain on its sides. The competition has put different states at a difficult situation. States might bear economic loss by choosing sides and face security threats from any side. With this background the study would investigate the chances of cooperation or conflict between US and China. The competitive situation might lead to protectionism or end of globalization. This might be a start of new cold war between US and China.

KEYWORDS

Technological Competition, Economic Rivalry, Artificial Intelligence, Chip Industry

Introduction

The US and China have experienced complex bilateral relationship since 1949. US supported nationalists, acknowledged Republic of China (Taiwan) government and distanced itself from the mainland China. The chances of collaboration emerged between Washington and Beijing when differences over the Great Leap Forward policies deteriorated relations between Soviet and China. Soviet declared China as its biggest threat (Friedberg, 2005; Taylor, 2005). The China-Soviet split set the stage for rapprochement for Washington and Beijing. The relation turned a dramatic turn after both countries agreed on US-China Relation Act of 2000 (Lawrence et al., 2021). With the passing of the accord, trade between the countries rose from 5 billion dollars to 231 billions dollars in 2004. China became the second largest trade partner of US after Canada. In 2005, US recognized China as an emerging power and expected that the country would be a responsible stakeholder in international system (Glaser, B., & Billingsley, B., 2011). In 2008, Beijing became the largest holder of US debt by surpassing Japan. The economic interdependence between the two countries reached to its apex with Beijing also became the world's second largest economy in 2010 as its resources reached to 1.33 trillion dollar (Smith, 2016; Wei & Yanbin,

2021). Since US recognition of China, there has been cooperation and divergence over different issues like human rights, Taiwan, trade and climate change (Glaser, 2015).

However, the relation started to deteriorate, as US trade deficit with China reached to 295 billion dollars. The situation became more complex, when China increased its defense budget by 18 percent in 2010 (Brooks & Wohlforth, 2015). US raised serious concern and termed this rise as non-constant with peaceful China rise. In 2014, Five Chinese nationals were indicted by US court with the charge of stealing trade technology from leading trade industries (Lewis, 2015). In reaction China suspended collaboration in cyber security working group. Accusations related to property and technology theft, trade disputes, inappropriate and unequal trade term further worsen the relations and led to a new strategic competition. Their relations have developed into an adversary over the last few years. This adversary has been manifested in different regions particularly in South China Sea and Taiwan Strait (Scobell, 2018). US strictly opposed China's controversial militarization and construction on the South China Sea and Taiwan Strait (Hu, 2021). The security and political differences ranging from territorial claims of South China Sea, Taiwan dispute and influence over key regions are the relevant flashpoints which have drawn other countries into conflict as well (Wuthnow, 2017). China's military and economic rise has introduced serious implication in Indo pacific and Asian regions as majority of the countries in these regions see Beijing with suspicion and uncertainty. This rise has also shifted Washington's efforts from counter terrorism to concentrate more to resist China economic and military ascendency (Fravel, 2016).

The strategic competition or rivalry has become a paradigm of international politics. This strategic competition includes multiple domains particularly the economic growth, trade influence, creating new world order, military and technological advancement. China envisages to be at par or even surpassed US in technological and global influence (Ortega, 2020). As a second largest economic power, Beijing is expecting to become a fully modernized state and achieve "the great rejuvenation of the Chinese nation" in 2049 (Goulard, 2020). These endeavors have attracted US focus to consider China as a strategic competitor and rival in economic, trade and advance technological manufacturing domains. The leading economic giants are competing for the technological edge in chip manufacturing, robotics and industrial innovation. This edge would ensure the future ascendency particularly in technological warfare (Peters, 2023). Presently, the US and its allies have a technological advantage over Beijing; however, China has increased its resources to fill the gap to surpass the US and its allies (Kim, 2024).

Literature Review

The tech competition started at the end of the Obama presidency intensified during the Trump era and has reached at its pinnacle under the Biden Administration. This war has many dimensions. Firstly, some European and Asian states have become the new battlefield of the technological struggle and profitable markets to both the US and China (Schneider-Petsinger, Wang, Jie & Crabtree, 2019). Secondly, US perceives Beijing's initiatives like Made in China 2025, vision 2035 and the Belt and Road Initiative (BRI) a significant threat to its global hegemony and security, and targets the Chinese technology industry mainly by blocking technology transfer (Friedberg, 2017). Thirdly, China has been spending a sufficient amount of resources on Research and Developing (R&D). The amount spent on R&D over the past two decades has come close to US spending on R&D. China was spending 0.65 and 1.45 percent of its Gross Domestic Product (GDP) on R&D in 1998 and 2008 respectively. Conversely, US spending on R&D of its GDP in the same years were 2.50 and 2.77 (Wei, Xie & Zhang, 2017; Guo, Guo & Jiang, 2016). US still spends more than China on R&D, however, China is closing this gap and may overpass Washington in

coming future. Fourthly, the competition has become more acute because of race of major companies to come in the Forbes Global 2000 list. Presently there are four US and Five Chinese companies in the top ten. In the 2000 most valuable companies there are 315 chines and 545 US companies are present in the group (AlHares, Elamer, Alshbili & Moustafa, 2020). Fifthly, the major Asian and European states like South Korea, Taiwan, Japan, Germany, Netherlands, Italy, Sweden and Switzerland and many more face a strange predicament. These countries want to align with China for the economy purposes and also need US affiliation to meet their security requirements (Winkler, 2023). Beijing relies heavily on some of these states for advanced High-Tech Manufacturing (HTM) (O'Rourke, 2020). The affiliation of these states with any single super power (either US or China) can impact or deteriorate decade's long political and economic cooperation of the European and Asian states. Both the superpowers are exerting influences to win support of these countries in their favor. It would become very difficult for many countries to resist pressure to choose sides. Both the superpowers have been investing highly on R&D to compete each other. To understand this renewed technological competition and its geopolitical implication, it would be necessary to understand both China and US stances respectively.

What are New Quandaries (Chinas Ambitions)?

China has made tremendous progress in different fields and trying to exceed US in every domain. China, a second largest economic power in the world rivals US in many spheres particular in making a rival economic and technological bloc. The competition was primarily begun with the announcement of Made in China 2025 (Levine, 2020). The plan seeks to increase the domestic content of core parts to 70 percent by 2025. It is a state led industrial policy which strives to make the country a dominant global HTM. These HTM include next-generation information technology (IT), advanced robotics, artificial intelligence (AI), 5G network, and semiconductors. The policy ultimate goal is to significantly reduce dependence on foreign technology. Made in China 2025 and projects like BRI have secured Beijing status as one of leading competitors in HTMs. These research and development programs have strengthened its growth and competitiveness in coming years (Agarwala & Chaudhary, 2021).

Although the country has made a remarkable progress in some HTM, but still struggling in critical core technologies particularly the semiconductors. China accounts for about 60 percent of global demand for semiconductors but only produces some 13 percent of global supply (Khan, Mann, & Peterson, 2021). The government has encouraged the Chinese companies, to invest in foreign semiconductor firms. The only aim for such investment is to gain access to more advanced technology. In 2016, the government declared that it would spend \$150 billion in next 10 years to develop a Chinese semiconductor industry. It will make Chinese firms able to manufacture microchips more advanced than US. It will enable China to make missiles, lasers, or air defense systems the most sophisticated in the world. These developments cautioned US and its allies' to take certain measures to protect its security and hegemony (Platzer & Sargent, 2016).

US and its Allies' Response to China's Endeavors

US has remained a pivotal actor in spreading liberal ideas across the world after the World War Two. Similarly, Washington advocated for the globalization and global economy. US supported liberal ideas and globalization to attract non-democracies. Its leaders believed that liberal ideas would convert non-democracies to democracies and economic interdependence would further strengthen peaceful relation among states (Müller, 2004). China is amongst those countries which benefited a lot from US and West liberal ideas and globalization. It acquired membership of many international cooperation

institutions. Since it became the member of World Trade Organization (WTO) many US allies opened its doors for trade with Beijing. China hugely benefited from President Clinton's liberal policies. Beijing made upward progress in industrial manufacturing by West liberal policies (Buzan & Cox, 2013). China economic and industrial rise started when US and Western countries started trade with China. Individuals from US and its allies opened large number of industries in China because of cheap labor. The policy of engagement did not bring western style democracy in China but it did bring significant economic prosperity among trading countries (Gilley, 2004). However, US a stanch exponent of globalization and liberal economic order has been campaigning for protectionist policy against China since the later has made dramatic progress in innovation relative to the United States.

US has introduced the policy of decoupling to limit China global rise. The economic interdependence restricts countries to wage war against each other; however, the rising competition between US-China has led US to overlook liberal tradition of non-interference of government in private economic affairs of individuals (Nye Jr, 2020). China's recent progress in technology has strengthened protectionism as US policy makers have placed restriction on private economic affairs of its citizen regarding trade with Chinese companies and individuals. US has also called its allies to restrict trade with Chinese companies and individuals (Rogers, Foxall, Henderson & Armstrong, 2020). President Trump administration imposed 50 billion dollars tariff on Chinese imports on more than eight hundreds products (Rasmus, 2018). This tariff was announced in response to Chinese theft of technology and intellectual property of major US companies. US administration believed that China was taking advantage of liberal and free trade rules. In retaliation, China also imposed 34 billion dollars tariff on over five hundreds US products. China criticized US tariff on Chinese products and termed it as trade bullying (Mansbach & Ferguson, 2021). President Trump remained tough on China throughout his presidency and declared Beijing the greatest threat to his country's interests. His administration added China's biggest chipmaker company, Semiconductor Manufacturing International Corporation (SMIC), to its trade blacklist (Bown & Irwin, 2019).

President Biden administration continued Tariff on China's product. The administration stressed on boosting investment in US manufacturing and technology to compete Beijing. It placed restriction on advanced computing chips and related technology to China. Restrictions were made only to stop China to produce advance military system by US technology. US companies and individuals who were earlier involved with China chip industry now required government approval for such actions. Such restrictions were also applied on foreign companies and individuals who were using US made technology (Schoenbaum, 2023). The administration has enacted trade restriction with China's firms and placed Huawei and more than 150 of its affiliates on the sanctioned list. US has urged and leaned on Taiwan, Japan, South Korea, Singapore, Germany and Netherland's firms to restrict and join its export controls against China. Taiwan possesses (accounting for 92% of the most advanced semiconductor manufacturing capacity) what China needs, however, Taipei heavily relies on US for its security. Nearly 90% of the AI chips that used by China are produced by US companies like Advanced Micro Devices (AMD) and Nvidia (Cohan, 2024). US imposition of export control can hamper China's progress and jeopardy its 2021-2026 five year plan of achieving technological supremacy. Japan and Netherland, have already announced export control on advance semiconductor equipment. These export controls potentially frustrate Chinese industrialists and restrain Beijing economic progress. In reaction to all these export controls and restriction, Chinese officials reacted that such actions by US would only isolate and hurt Washington long term goals. US companies' as well allied countries would suffer a massive economic loss by export control against China.

China might resort to military action to influence others countries to gain HTM (Morrison, 2019).

Material and Methods

The study is purely qualitative in nature. It mainly explains the nature of competition among major powers that had developed advanced technologies in computing, robotics and industrial innovation. With this background the study has implied secondary sources mainly books and scholarly articles which have discussion about tech competition and rivalries

Results and Discussion

It seems quite evident that China cannot rise peacefully and prevailing US status quo would not allow it. US has emerge as regional power in the Western hemisphere after the collapse of Soviet Union and became a dominant power in the world affairs. Similarly, China has established itself as dominant power in Asia pacific. A lot of literature explains China's aggressive policies in the region (South China Sea), its assertive stance and use of military against US and its allies for achieving regional and global supremacy. The country has increased its trade with close US allies to counter Washington's hegemony in Western Hemisphere and other regions.

A large scholarship is also available which presents how US has pursued its export control against China and limited its ascendancy in technology. US has achieved this by introducing subsidies plan for its allies to compensate economic loss. However, China has shown capabilities and willingness to use its growing economic clout over countries to change their behavior in Beijing favor. Over the last two decades, Beijing has established strong economic ties with close US allies. The country has become one of the main trading partners of Taiwan, South Korea, Japan and most Southeast Asian countries. This trend is also on the rise in many Western countries as well (Smith, 2014). Below is the detail of China's trade with countries having close ties with US.

Taiwan trade with China and Hong Kong is accounted for 42 percent, much larger than US which is less than 15 percent. A large number of Taiwan based factories operate in mainland China and earns more than 200 billion dollars annually. Statistics show that Taiwan's imports have surged 87 percent from China versus 44 percent growth in imports from the US (Cheng, 2022). South Korea's most vital trade partner for the past decade has remained China. Although, Seoul export toward Beijing has fallen from 25 to 19 percent, while the exports to US has increased from 14 to 18 percent. However, there is marginal difference overall as exports to US and China in 2023 remained 19 and 18 percent respectively (Wang, 2024). China is amongst the one of the largest trading partner of Japan. Beijing is also 'one of the best destinations for Japanese individuals and companies. Japan exports to China over the last few years have increased significantly. The trade increased from 41.6%, from 22.5 billion dollars in 2017 to 128 billion in 2022. Similarly, China's export to Japan over the last five years increased 34 percent. It increased from 32.6 billion dollars in 2017 to 144 billion dollars in 2022. China has developed sound economic ties with major European Union economic giants as well (Nishino, 2024).

In Europe, China trades more with Germany than any other EU member. China exported goods of 89 billion dollar to Germany. China trade with Germany has increased 58 percent annually since 2017. It increased from 8.9 billion in 2017 to 89 billion dollars in 2022. Germany export to China also improved the same way. During the last 22 years, it increased from 6.9 billion dollars to 95 billion dollars (OEC, 2024). France is China's second

largest trading partner after Germany. The relations between the two countries have undergone significant improvement in bilateral cooperation on global issues and commitment to strengthen economic ties. The relations further improved by President Xi's visit to France in 2024. By signing agreements in civil aviation and intellectual property rights, China has emerged as one of the leading sources of foreign investment in France (Interesse, 2024). During the last few years, China's export to France has jumped from 4.24 billion dollars to 45.43 billion dollars. Likewise, France exported materials worth 2.7 billion dollars to 21.2 billion dollars during the last five years. China is the third largest trading partner after Germany and France is the Netherlands. The country imports electronic devices, computer-related materials, and laptops from China worth over 64 billion Euros. The Netherlands also exports 22 billion Euros worth of Dutch chip machines. In 2022, China became the 10th largest export destination for the country. This detail indicates that export control against China would bring serious economic loss to all countries associated with Beijing.

Conclusion

US and China are the leading powers in the world in many domains and are challenging and competing with each other in different fields since the last two decades. However, in the tech field, both are in the early stage of a competition and it is going to be the most prominent in the succeeding era of technology. Both are exerting pressure on their allies to join either side. No country wants to bear economic loss by joining any side. US has been pushing its allies by subsidies for export control against China to restrict Beijing's access to semiconductor technologies. These trade controls have crystallized into a tech war. Countries trading with China would suffer economic losses and also Beijing's anger. US export control against China can make Beijing more assertive. These measures have already started a new cold war and possibilities of the end of globalization.

Recommendations

- Export control is not the viable solution for enduring peace among major powers.
- Countries joining export control would suffer huge economic loss so it should be avoided at every possible way.
- All the major powers should respect each other's area of influence.
- Tech warfare should be replaced by tech cooperation.

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